



GUIDE
FOR
THE INVESTIGATION
OF
DRY PIPE, DELUGE, AND PRE-ACTION VALVES
FOR
FIRE-PROTECTION SERVICE

UNDERWRITERS' LABORATORIES OF CANADA

GUIDE
FOR
THE INVESTIGATION
OF
DRY PIPE, DELUGE, AND PRE-ACTION VALVES
FOR
FIRE-PROTECTION SERVICE

FIRST EDITION. February, 1975

TABLE OF CONTENTS

	<u>PAGE</u>
General	1
1. Scope.	1
2. Glossary	1
3. Components	3
Construction and Assembly	4
4. Sizes.	4
5. Working Pressures.	4
6. Operation.	4
7. Bodies and Covers.	5
8. Valve Mechanisms	6
9. Latches, Antireseat.	8
10. Clapper Stops.	8
11. Clapper Rings and Seat Rings	8
12. Clearances	10
13. Valve Settings	10
14. Valve Gags	11
15. Intermediate Chamber Automatic-Drain Valves.	11
16. Priming Water Connections.	11
17. Instruction Charts and Trim.	11
Performance	11
18. General.	11
19. Metallic Materials	12
20. Rubber Materials	12
21. Installation	12
22. Operation.	12
23. Normal Operation Test.	15
24. Reseating Test	16
25. Pilot Sprinkler Height Limitations Test.	17
26. Deformation.	18
27. Hydraulic Friction Loss.	19
28. Strength of Body	19
Manufacturing and Production Tests.	19
29. General.	19
Marking	21
30. Content.	21





INCORPORATED 1920

UNDERWRITERS' LABORATORIES OF CANADA

General Offices and Testing Station

7 CROUSE ROAD, SCARBOROUGH, ONTARIO

Telephone 757-3611 Area Code 416

In Reply
Please Refer to

ULC Subject C260-1975

GUIDE
FOR
THE INVESTIGATION
OF
DRY PIPE, DELUGE, AND PRE-ACTION VALVES
FOR
FIRE-PROTECTION SERVICE

GENERAL

1. Scope

1.1 These requirements apply to valve equipment employed in piping systems to automatically supply water to dry pipe, deluge (empty pipe), and pre-action sprinkler systems for fire-protection service.

1.2 Valves covered by these requirements may be of differential type, latched-clapper type, low-differential type, or combinations of these types.

1.3 Requirements for the installation and use of the valves covered by these requirements are included in the Standard of the National Fire Protection Association for the Installation of Sprinkler Systems, NFPA No. 13.

2. Glossary

2.1 For the purpose of this Guide the following definitions apply.

2.2 DRY PIPE VALVE - An automatic sprinkler water-supply control valve designed so that air pressure in a system of piping will hold back water pressure until such time as the air pressure in the system is lowered sufficiently to cause automatic operation of the valve and admission of water into the system.

2.3 DELUGE VALVE - An automatic water-supply control valve intended to be operated by some auxiliary means to admit water into a system of closed piping.

2.4 PRE-ACTION VALVE - An automatic water-supply control valve intended to be operated by some auxiliary means to admit water into a system of closed piping.

2.5 SPECIAL SYSTEM WATER CONTROL VALVES - Deluge, pre-action, and other specialized types of valves.

2.6 DIFFERENTIAL - The ratio of system air pressure to water-supply service pressure, expressed as gauge pressures as measured at the trip point.

2.7 DIFFERENTIAL DRY PIPE VALVE - A dry pipe valve having an air clapper of large diameter relative to the diameter of the water clapper with the two separated by an intermediate chamber maintained at atmospheric pressure.

2.8 LOW-DIFFERENTIAL DRY PIPE VALVE - A dry pipe valve having a single clapper member whose effective area exposed to system air pressure is only slightly larger than the effective area exposed to supply water pressure. Such a valve has a differential of 1.5:1 or lower.

2.9 LATCHED-CLAPPER TYPE VALVE - A valve in which a mechanism acts to produce a force which is multiplied through a series of levers, links, or latches to maintain the water clapper in the closed position. Such a valve is sometimes referred to as a mechanical type.

2.10 LATCH, ANTIRESEAT - A latch mechanism provided in a differential dry pipe valve designed to prevent the clapper from returning to its set position after operation.

2.11 CLAPPER - That portion of a valve mechanism on which air pressure or water pressure, or both, act and which opens to allow water to flow through the valve when operated.

2.12 INTERMEDIATE CHAMBER - That portion of a differential or low-differential dry pipe valve which separates the air and/or water clapper seating surfaces and is at atmospheric pressure when the valve is in the set position.

2.13 SET POSITION - The position of a valve clapper and other operating parts when the valve is ready for automatic operation.

2.14 LEAK POINT - The system air pressure and service water pressure at which water begins to emit from the intermediate chamber drain during the tripping sequence of a valve.

2.15 TRIP POINT - That system air pressure and service water pressure at which the valve clapper begins to move away from the set position to allow water to flow into the system.

2.16 VALVE GAG - Any supplementary means which will prevent normal operation.

2.17 AUTOMATIC DRAIN VALVE - A normally open valve connected to the intermediate chamber of a dry pipe valve so as to automatically drain water from the chamber and vent the chamber to atmosphere when the valve is in the set position, and arranged to close to prevent water flow from the chamber after the valve is tripped.

2.18 WATER-MOTOR OPERATED ALARM - A mechanical alarm device (operated by energy or water flow) attached to a dry pipe, pre-action, or deluge valve and supplied with water from the intermediate chamber or discharge side of the valve, to sound an alarm on operation of the valve.

2.19 PRIMING CONNECTION - A port provided in the valve body to allow water to enter above the clapper when the valve is in the set position.

2.20 ALARM DEVICE - A mechanical or electrical device to sound an alarm on operation of the valve.

2.21 TRIPPING DEVICE - A supplementary device for operating a valve, usually initiated by automatic detection of heat, smoke, or other products of combustion. Such device may or may not incorporate the detection means.

2.22 PILOT SPRINKLER - An automatic sprinkler connected to an inert gas, air, or water line, which in turn is connected to a deluge, pre-action, or other special water-supply control valve, the operation of which will cause the valve to operate.

3. Components

3.1 Auxiliary components or attachments to valves, such as water-motor-driven alarm gongs, electric circuit closers, pressure-operated switches, pressure gauges, etc., shall comply with the requirements for such devices or products and also with respect to their suitability for the particular application.

CONSTRUCTION AND ASSEMBLY

4. Sizes

4.1 Valves are to be designed for use with standard pipe of 2- to 8-inch sizes.

4.2 Valve size refers to the nominal diameter of the waterway through the inlet and outlet connections and to the pipe size for which the connections are intended. The diameter of the waterway through the water seat ring of the valve may be reduced below that of the waterway through the inlet and outlet connections as a design means to develop a more compact valve. Six-inch valves may be provided with 8-inch end flanges.

5. Working Pressures

5.1 A valve shall be constructed to withstand a maximum water service pressure of 175 pounds per square inch.

6. Operation

Differential Type - Dry Pipe Valves

6.1 A dry pipe valve of the differential type shall have a working differential within the range of 4.5:1 and 11:1 for all service pressures between 20 and 175 pounds per square inch. The difference between the maximum and minimum values of the working differential, as determined during tests of any individual valve, shall not exceed 3.5.

6.2 A dry pipe valve of the "low-differential" type, for use only with designated attachments, components, or trim, shall have a working differential within the ratio of 1:1 and 1.5:1 for all sizes of valves and for all service pressures from 20 to 175 pounds per square inch.

Latched-Clapper Type - Dry Pipe Valves

6.3 The minimum system air pressure at which a dry pipe valve of the latched-clapper type will trip shall be at a value to provide for positive tripping action under any condition. It is recommended that the minimum tripping pressure be 15 pounds per square inch at 150 pounds per square inch service pressure.

6.4 A latched-clapper dry pipe valve shall be designed to prevent leakage of water from the water side of the valve to the air side when set or be provided with a positive means of venting any leakage of water from the space above the clapper.

Deluge and Pre-Action Valves

6.5 A deluge or a pre-action valve shall be operable by automatic and manual means. The valve shall be arranged for attachment of both types of tripping means.

6.6 An automatic operating means of the electric type shall be designed for operation from both a primary and a secondary source of electric energy.

7. Bodies and Covers

7.1 The body and the cover of a valve may be made of cast iron, bronze, aluminum, or other materials having equivalent strength and corrosion resistance characteristics.

7.2 The dimensions of all flanges, flange pipe joints, and threaded body openings shall conform, wherever possible, to the following American National Standards:

Pipe Threads - ANSI B2.1-1968
Pipe Threads (Dry Seal) - ANSI B2.2-1968
Flanges - ANSI B16.1-1967.

7.3 Provision shall be made in a valve body for connection of all outside fittings and attachments specified by the Standard of the National Fire Protection Association, for the Installation of Sprinkler Systems, NFPA No. 13-1974.

7.4 The point of connection of alarm piping to a valve shall be such that pressure sufficient to operate alarms will be available at any flow rate through a 4-, 6-, or 8-inch valve from 1 to 20 feet per second, with a residual pressure at the valve of 15 pounds per square inch.

7.5 A tapped opening in a valve body for main drain connection shall be 1-inch pipe size for 2-inch valves, at least 1-1/4-inch pipe size for 2-1/2-, 3-, and 3-1/2-inch valves, and 2-inch pipe size for 4-, 5-, 6-, and 8-inch valves.

7.6 A tapped opening provided for main drain piping shall be located on the water-supply side of the valve clapper. In a low-differential type valve an additional tapped opening for system drain piping shall be provided on the system side of the clapper.

7.7 Body handhole openings shall be provided to permit access to working parts.

7.8 A cover plate shall be bolted to the body of a valve of 2-1/2-inch size and larger.